Imaging Ultrasound Technique in Covid-19 Pneumonia

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ARTICLE INFO

A B S T R A C T

The Covid-19 disease caused by the SARS CoV-2 virus has become an epidemic in Indonesia since President Joko Widodo first announced it in early March 2020. To establish a diagnosis, apart from examining throat swabs, sputum, and Broncho alveolar lavage, chest imaging is also needed. This study aims to report the results of ultrasound (USG) imaging techniques in helping to diagnose Covid-19 disease treated by RSPAW Salatiga. The research method chosen was descriptive-analytic case reports. The study results explained that based on the patient's chest ultrasound, bilateral pneumonia was found in the peripheral lung with pleural thickening following Covid-19 pneumonia, no pleural effusion, and no pericardial effusion.

1. INTRODUCTION

Covid-19 is a pandemic disease that has spread very rapidly to countries in Asia, America, Africa, and Europe (Dwinantoaji&Sumarni) since the new coronavirus disease was announced by the World Health Organization (WHO) (Sanyasi &Pramudita). WHO data states that as of early October 2020,235 countries have been infected, with more than 36 million people confirmed, and more than one million people dead (www.who.int). In Indonesia, since it was announced for the first time on March 2, 2020, until mid-October 2020, more than 357,762 people were confirmed positive, with 63,739 active cases, 281,592 patients recovered, but 12,431 patients died (www.covid19.go.id).

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The human-to-human transmission of Covid-19 is the dropped spark from an infected person from the nose or mouth when coughing, sneezing, or talking (Isbaniah, 2020). Since the beginning of 2020, there has been an increase in the number of infections with the COVID-19 virus, previously known as 2019-nCov (Isbaniah&Susanto, 2020). The diagnosis is confirmed by history taking, physical examination, and supporting investigation. Materials for examining the 2019 coronavirus disease can be in the form of throat swabs, sputum, and bronchoalveolar lavage (BAL) (Handayani et al., 2020).

Other supporting examinations for Covid-19 are adjusted to the degree of morbidity. In the degree of Acute Respiratory Distress Syndrome (ARDS) disease,

chest imaging with a chest CT scan or ultrasound (USG) of the lungs found bilateral opacity, unexplained pleural effusion, lung collapse, lobe collapse, or nodule (Handayani et al., 2020). The use of pulmonary ultrasound provides several advantages over the use of chest CT and can play a complementary role in the management of Covid-19 (Zhang et al., 2020).

The role of ultrasound in evaluating respiratory diseases is currently well documented. Volpicelli and Gargani (2020) said that there is an ultrasound pattern that can be an alternative diagnosis for Covid-19. Pulmonary ultrasound is one of the classic imaging methods that allowthe evaluation of peripheral lungs, making it an excellent technique in assessing Covid-19 (Fiala, 2020). Lung ultrasound is a relatively new technique and has been widely used since the pioneering work of Lichten Stein &Axler published in the early '90s (Buda et al., 2020). The images obtained by ultrasound of the lungs are largely non-anatomical. Ultrasound is based on artifacts produced by the interaction of the ultrasound beam with the acoustic interface between the chest tissue and air in the alveoli distributed over the lung surface. The ultrasound file will pass through the skin, subcutaneous tissue, muscles, until it reaches the pleura (Volpicelli & Gargani, 2020). The maximum acoustic air network suitability obtained will be visualized as an echo of horizontal linear artifacts. Below the pleural line is gamma that produces pleural lines at equal intervals with equal distances (Vieira et al., 2020).

The role of ultrasound in helping to diagnose Covid-19 has attracted researchers (Hosseiny et al., 2020). However, in Indonesia, there is still little literature that discusses it. This study aims to report on the imaging technique of ultrasound pneumonia in helping to diagnose Covid-19 which is being treated by Lung Hospital Dr. ArioWirawan Lung Hospital (RSPAW) Salatiga.

2. METHODS

The method used in this study is descriptive-analytic case reports. The research flow was to observe patients from the Inpatient Installation (IRNA) of RSPAW Salatiga, then perform an ultrasound examination. The results of ultrasound imaging were further analyzed by a radiology specialist.

3. RESULTS AND DISCUSSION

Case Report

The female patient has a history of complaints of fever, coughing, and shortness of breath. The results of the SWAB examination were tested positive for Covid-19.

On chest ultrasound examination, bilateral pneumonia was found in the peripheral lung with thickening of the pleura following Covid-19 pneumonia. Other results found no pleural effusion, but also no pericardial effusion (**Fig. 1** and **Fig. 2**).
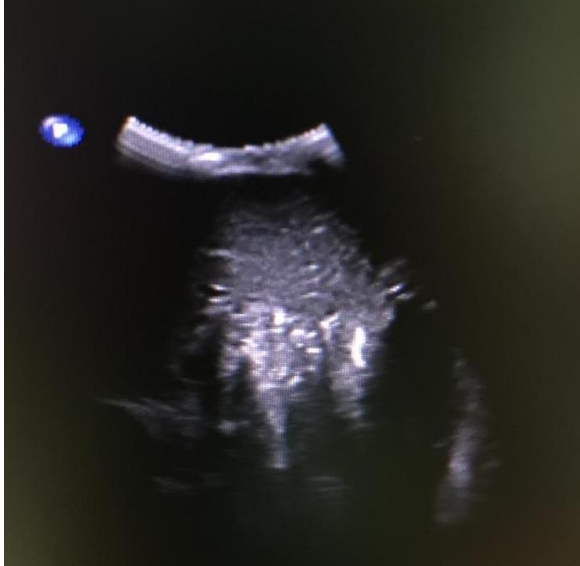
Fig 1. Ultrasound imaging of Lung from Covid-19 patient using a Convex (convex) Ultrasound Probe
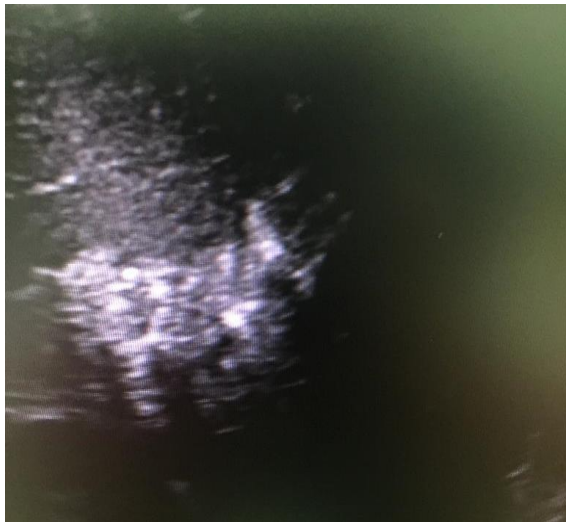

Fig 2. Region of Interest (ROI) of Lung Imaging from Covid-19 patient using a Convex (convex) Ultrasound Probe

Discussion

Pulmonary ultrasound is an ultrasound technique based on the visualization of artifacts originating from acoustic mismatches between the air tissues on the surface of the lung, usually in the periphery of the lungs. This is consistent with the fact that SARS-COV-2 is a new virus with an average diameter of only about 120 nm. This size allows the virus to be easily inhaled into the peripheral airways and alveoli, without any immune barrier so that the lesions obtained on ultrasound are peripheral to the lung. On the results of this ultrasound, bilateral consolidated lesions were found following the COVID-19 description. This result is consistent with Handayani et al. (2020) that bilateral opacity was found on the ultrasound examination of the lungs of Covid-19 patients.

4. CONCLUSION

This study reports the results of ultrasound imaging (USG) of pneumonia in Covid-19 patients at RSPAW Salatiga. Based on the previous description, it can be concluded that the ultrasound technique is excellent in assessing Covid-19.

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